PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
12232PCT CMH:MM		
International Application No.	International Filing Date *(day/month/year)*	Priority Date *(day/month/year)*
PCT/AU2003/000410	4 April 2003	4 April 2002
International Patent Classification (IPC) or national classification and IPC		
Int. Cl. [7] A61K 7/16, 31/155, 31/428, 31/7028, 33/30		
Applicant		
H A MILTON HOLDINGS PTY LTD et al		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 4 sheets, including this cover sheet.

   [X] This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 3 sheet(s).

3. This report contains indications relating to the following items:

I	[X]	Basis of the report
II	[ ]	Priority
III	[ ]	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
IV	[ ]	Lack of unity of invention
V	[X]	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
VI	[ ]	Certain documents cited
VII	[ ]	Certain defects in the international application
VIII	[ ]	Certain observations on the international application

Date of submission of the demand	Date of completion of the report
15 September 2003	2 January 2004
Name and mailing address of the IPEA/AU	Authorized Officer
AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	**TERRY SUMMERS** Telephone No. (02) 6283 3126

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/AU2003/000410

I. Basis of the report

1. With regard to the elements of the international application:*

- [ ] the international application as originally filed.
- [X] the description, pages **1-17,** as originally filed,
  pages , filed with the demand,
  pages , received on with the letter of
- [X] the claims, pages , as originally filed,
  pages , as amended (together with any statement) under Article 19,
  pages , filed with the demand,
  pages **18-20,** received on **9 December 2003** with the letter of **9 December 2003**
- [X] the drawings, pages **1/2-2/2,** as originally filed,
  pages , filed with the demand,
  pages , received on with the letter of
- [ ] the sequence listing part of the description:
  pages , as originally filed
  pages , filed with the demand
  pages , received on with the letter of

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language which is:

- [ ] the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).
- [ ] the language of publication of the international application (under Rule 48.3(b)).
- [ ] the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- [ ] contained in the international application in written form.
- [ ] filed together with the international application in computer readable form.
- [ ] furnished subsequently to this Authority in written form.
- [ ] furnished subsequently to this Authority in computer readable form.
- [ ] The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- [ ] The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. [ ] The amendments have resulted in the cancellation of:
   - [ ] the description, pages
   - [ ] the claims, Nos.
   - [ ] the drawings, sheets/fig.

5. [ ] This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report*

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	1-23	YES
	Claims		NO
Inventive step (IS)	Claims	1-23	YES
	Claims		NO
Industrial applicability (IA)	Claims	1-23	YES
	Claims		NO

2. Citations and explanations (Rule 70.7)

Citations

The report has considered the following documents cited in the International Search Report:

D1: EP 0026252 A

D2: WO 01/22930 A

D3: EP 0181161 A

D4: Neohesperidine Dihydrochalcone (NHDC). Product Information

D5: EP 0920857 A

D1 discloses an oral formulation comprising chlorhexidine gluconate, sodium saccharine, zinc acetate, fruit essence and other conventional components of oral formulations, see example 7.

D2 discloses an oral formulation comprising chlorhexidine gluconate, sodium saccharin, zinc acetate, sorbitol and other conventional components of oral formulations, see page 9 table.

D3 discloses an oral formulation comprising chlorhexidine gluconate, sodium saccharin, zinc gluconate, flavour mix (mint/spearmint) and other conventional components of oral formulations, see example 1-2.

D4 discloses the synergistic sweetening effect Neohesperidine Dihydrochalcone (NHDC) has with other sweeteners such as saccharin. This document further discloses the use of NHDC in tooth pastes and mouth-wash.

D5 discloses an oral formulation comprising chlorhexidine gluconate, saccharin, zinc gluconate, xylitol and other conventional components of oral formulations, see page 4 table A.

Novelty and Inventive Step

The invention defined in claim 1-23 encompass oral formulations comprising chlorhexidine, a zinc salt, a masking/flavouring component comprising an immediate action sweetening agent (first sweetening agent), and a second sweetening agent, Neohesperidine Dihydrochalcone, having a delayed but prolonged sweetening effect, and other conventional components of oral formulations.

Continued in Supplementary Box I

Supplemental Box I
(To be used when the space in any of the preceding boxes is not sufficient)

Continuation of V

Novelty and Inventive Step (continued..)

The invention defined in claims 1-23 are novel in light of D1-D5. D4 discloses the synergistic sweetening effect of NHDC and therefore does not disclose the claimed invention. Even though D1-D3, D5 disclose compositions comprising chlorhexidine, a zinc salt, a masking/flavouring component comprising an immediate action sweetening agent (such as saccharin or xylitol), and other conventional components of oral formulations, none of these documents include the use of the **sweetening agent, NHDC, which has a delayed but prolonged sweetening effect,** in addition to conventional sweetening agents. In light of this there is no disclosure or suggestion in the prior art of an oral formulation comprising chlorhexidine, a zinc salt, a masking/flavouring component comprising an immediate action sweetening agent, **and a second sweetening agent, Neohesperidine Dihydrochalcone, having a delayed but prolonged sweetening effect,** and other conventional components of oral formulations. Therefore claims 1-23 are novel in light of D1-D5.

The invention defined in claims 1-23 appears to involve an inventive step in the light of D4. Even though D4 discloses the synergistic sweetening effect NHDC has with other sweeteners such as saccharin and that NHDC can be used in tooth pastes and mouth-wash, there is no disclosure or suggestion that this compound will sweeten solutions of chlorhexidine. Furthermore D4 does not disclose the ability of NHDC to have a prolonged sweetening effect in the presence of other sugars, instead D4 discloses that NHDC increases the intensity of the sweetness of the other sugars. For these reasons the invention defined in claims 1-23 appears to involve an inventive step.

Industrial Applicability

Claims 1-23 are industrial applicable.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. An oral formulation comprising:
   (a) chlorhexidine or a salt thereof;
   (b) a zinc salt;
   (c) masking and/or flavouring agents, including
   (i) a first sweetening agent having an immediate but transient effect and (ii) a second sweetening agent having a delayed but prolonged effect, said second sweetening agent being neohesperidine chalcone; and
   (d) other conventional components of oral formulations.

2. An oral formulation according to claim 1, wherein said first sweetening agent is saccharin or a salt thereof.

3. An oral formulation according to claim 2, comprising up to 0.05% (w/w) of saccharin sodium.

4. An oral formulation according to any one of claims 1 to 3, comprising up to 0.1% (w/w) of neohesperidine dihydrochalcone.

5. An oral formulation according to any one of claims 1 to 4, comprising 0.1 to 1.0% (w/w) of chlorhexidine or a salt thereof.

6. An oral formulation according to any one of claims 1 to 5, comprising 0.1 to 1.0% (w/w) of the zinc salt.

7. An oral formulation according to any one of claims 1 to 6, comprising one or more gluconate salt(s).

8. An oral formulation according to any one of claims 1 to 7, wherein the zinc salt is zinc gluconate.

9. An oral formulation according to any one of claims 1 to 8, wherein the chlorhexidine salt is chlorhexidine digluconate.

10. An oral formulation according to claim 9, comprising about 0.6% (w/w) of chlorhexidine digluconate.

11. An oral formulation according to any one of claims 1 to 8, wherein the chlorhexidine salt is chlorhexidine diacetate.

12. An oral formulation according to any one of claims 1 to 11, further comprising additional masking and/or flavouring agents selected from flavouring oils and methyl salicylate.

13. An oral formulation according to any one of claims 1 to 12, comprising 0.1 to 5% (w/w) of said masking and/or flavouring agents.

14. An oral formulation according to any one of claims 1 to 13, comprising components (d) selected from the group consisting of: fluoride materials, dentally acceptable abrasive materials, surfactants, thickeners, gelling agents, humectants, alcohol and water.

15. An oral formulation according to claim 14, wherein said surfactants are selected from non-ionic and zwitterionic surfactants.

16. An oral formulation according to claim 15, wherein said non-ionic surfactants are macrogol ethers.

17. An oral formulation according to claim 15 or claim 16, wherein said zwitterionic surfactants are selected from the group consisting of betaines and alkylamido alkyl amines.

18. An oral formulation according to any one of claims 15 to 17, wherein said surfactants comprise a combination of non-ionic and zwitterionic surfactants.

19. An oral formulation according to claim 18, wherein said surfactants comprise a combination of a macrogol ether and cocamidopropyl betaine.

20. An oral formulation according to claim 18 or claim 19, wherein the ratio of the non-ionic surfactant(s) to the zwitterionic surfactant(s) is about 2.4:1 by weight.

21. An oral formulation according to any one of claims 15 to 20, comprising 0.1 to 10% (w/w) of said surfactants.

22. An oral formulation according to claim 21, comprising about 1.7% (w/w) of said surfactants.

23. An oral formulation according to any one of claims 1 to 22, being a toothpaste, a dentifrice, mouthwash, chewing gum or a lozenge